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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XVI.]

New York, April 8, 1889.

[No. 4.

Contributions to the Bryology of Canada.

BY JOHN MACOUN.

A catalogue of the whole flora of the Dominion of Canada, by the writer has, for five years, been in course of publication by the Geological and National History Survey, and has now extended to Part IV., which includes the Endogens. The next part of the Catalogue (Part V.) will include the ferns and their allies, mosses, liverworts, and the Characeæ. In connection with the preparation of this part of the catalogue, I enlisted the services of N. Conrad Kindberg, Ph.D., Linköping, Sweden, who has examined the greater part of our mosses, and discovered a number of species new to science, and many others new to North America. At the same time I am issuing Centuries of Canadian mosses for the purpose of eliciting criticism, so that when the work is done it may be as near correct as possible.

The following descriptions of species are from the pen of Dr. Kindberg. The species were all detected by the writer, besides many others which will be published later.

DICRANELLA PARVULA, Kindberg, n. sp.

Allied to *D. varia*. Plants very short, densely cæspitose in small tufts, dark green. Leaves crenulate all around, sub-ovate; cells short, oblong-quadrangle, the basal linear; costa very thick and brown, excurrent, denticulate above forming at least half of the acumen. Perichetial leaves denticulate above. Capsule obovate, sub-erect or inclined without a neck, not striate; beak very short and thick; annulus scarcely loosed; teeth orange, pale at apex, partite, without basilar membrane, not papillose; pedicel pale red-yellow; 1 cm. long or shorter, straight or curved only at apex. Dioecious.

On earth in the valley of Six Mile Creek, Selkirk Mountains, and at Kicking Horse Lake, Rocky Mountains. Collected July, 1885, by John Macoun.

DICRANUM SCOPARIUM, (L.), Hedw. var. SCOPARIFORME,
Kindb, n. var.

Intermediate between *D. scoparium* and *D. fuscescens*. Dioecious. Leaves greenish-yellow, flexuous, lanceolate, subulate with a short and flat subula; margins nearly flat or slightly incurved, densely and sharply serrate to one-third; cell-walls not interrupted by pores; upper cells oblong-oval, lower not much narrower, inner basal light brown; costa thick, percurrent with two serrate ridges at the back in the upper part. Capsule curved, not striate; pedicel red, short.

Described from specimens gathered at bottom of cañon below the bridge over Elk River, Rocky Mountains, by Dr. G. M. Dawson, 1883. Since found to be quite common in Canada east of the Great Lakes.

DICRANUM LEIONEURON, Kindberg, n. sp.

Stem tall, sparingly radiculose. Leaves pale-yellow, glossy, sub-erect subplane, ovate-lanceolate, narrowly short-subulate, subentire or with few teeth at apex; cells not porose, narrow except the basilar; alar cells brown; the median basal cells hyaline; costa smooth, very narrow. Barren.

In damp woods on McNab's Island near Halifax, Nova Scotia. June 19, 1883. John Macoun, collector.

DICRANUM STENODICTYON, Kindberg, n. sp.

Allied to *Dicranum scoparium*. Dioecious. Tufts very dense, blackish-brown, only the top leaves straw-yellow; 1-3 cm. high. Leaves flexuous, not undulate or crispate, short ovate-lanceolate, short-acuminate and blunt; margins flat above the middle, densely serrate above, more or less denticulate below; cell-walls not porose; upper cells oblong, lower sublinear; alar hyaline, faintly brown; costa narrow, not percurrent, simply dentate at back. Barren.

The color of the plant resembles *Hypnum sarmentosum*. In damp woods, Nova Scotia, Anticosti Island, and in the neighborhood of Ottawa, Ont. Collected first in June, 1883, by John Macoun.

BARBULA MEGALOCARPA, Kindberg, n. sp.

Differs from *B. ruralis* in the capsule being very much longer, and cylindrical, at least twice the length of the conic operculum, the peristome shorter than the tubulose base, the middle leaves more distant, the upper not emarginate or rounded at the apex, rather acute; the hair point is red at the base.

Not rare on rocks amongst other mosses in oak woods near Victoria, Vancouver Island. Collected in May 1875, and named *B. ruralis* var. *gigantea* by Austin. No mention of this form is made by Lesquereux and James. The specimens upon which the species is founded were collected April 21, 1887, by John Macoun.

GRIMMIA ARCUATIFOLIA, Kindberg.

Loosely tufted; tufts blackish, dark green above. Stems 5 cm. long, denudate at base. Lower leaves small, upper long and not crisped; hooked-recurved when moist, ovate-lanceolate, long-acuminate and acute, reflexed at least at one border with a short denticulate hair-point; the most basal cells pellucid, long and narrow, the upper basal cells sinuous, the marginal uniseriate and hyaline or not distinct; other cells chlorophyllous, quadrate and not sinuous; costa percurrent canaliculate, pellucid in the middle. Probably allied to the European *Grimmia elatior*, Bryol. Eu., but this species has also the upper cells sinuous.

Abundant on dry rocks at Cedar Hill, near Victoria, Vancouver Island. April 21, 1887. John Macoun.

RACOMITRIUM MACOUNII, Kindberg, n. sp.

Plants fastigiately branching; innovations without lateral fasciculate branchlets. Tufts loosely caespitose, naked at base, brown, with green tips. Stems 5-7 cm. long, sparingly branching at the tips. Leaves loose, crispate when dry, patent or squarose when moist, ovate-lanceolate, acute, muticous, smooth and entire; at one side slightly reflexed or erect, on the other always erect; upper cells quadrate and obscure, scarcely or not erose; lower linear and sinuose, marginal uniseriate, quadrate-rectangular and hyaline, basal yellow; costa brown and percurrent. Capsule oblong, dark brown, not striate; teeth orange, pertuse or cleft to below the middle, smooth; pedicel 0.5 cm. long, straight or suberect and contorquate.

In large masses, on huge boulders between Cathedral Mountains and Mount Stephens near Field, Rocky Mountains; also on rocks near the Glacier Hotel, Selkirk Mountains, B. C. Collected August, 1885, by John Macoun.

Scouleria aquatica, Hook. (*Grimmia Scouleri* C. Müll. Lesq. & James Manual.) This genus (*Scouleria*) is more nearly allied to *Cinclidotus* than to *Grimmia*. The plant occurs in two forms, possibly proper species, my specimens are not fruiting.

(a) *virescens*. Kindb.

Leaves dark green when dry, flaccid, oval-oblong, broader at the middle. On the rocks in Glacier Creek, above the railway bridge at the Glacier Hotel, Selkirk Mountains, B. C. 1885.

(β) *nigrescens*. Kindb.

Leaves blackish green when dry, rigid ovate-oblong, broader below the middle. On rocks in the bed of Nanaimo River, below the railway bridge, Vancouver Island. Collected 1887.

MERCEYA LATIFOLIA, Kindberg. n. sp.

Densely cæspitose. Plants 1–2 cm. high, brown ferruginous below, green at the tips, divided, at the base radiculose. Leaves quite smooth, spatulate-lingulate, obtusate or sub-acute; entire, slightly reflexed at base, plane above, broad-bordered with greater, orange-colored cells; basal cells narrow, upper small and round costa percurrent, or scarcely excurrent. Habit of *Barbula ruralis*.

The systematic position of this genus is not quite definite. Prof. Boulay unites it to the Weissiæ; Schimper considered it allied to *Encalypta*; we suppose that it is more nearly related to *Barbula*. The allied European *Scopelophila ligulata*, Spruce, (*Merceya ligulata*, Sch.) differs in the leaves, smaller, narrow and rounded above, and the abbreviated costa; the capsule is gymnostomous.

Collected on the upper slopes of Mount Finlayson, near Goldstream, Vancouver Island, May 18th, 1887, by John Macoun.

PHYSCOMITRIUM MEGALOCARPUM, Kindberg, n. sp. (*Gymnostomum megalocarpum*, Kindb. Mss.)

Nearly allied to *Physcomitrium pyriforme* (*Gymnostomum pyriforme*, Lindb.); leaves longer, more or less acuminate, distinctly yellow-margined; cells smaller, the upper narrower; capsule larger, subglobose; lid conic, without distinct beak; calyptra unsymmetrical bilobed with long acumen; pedicel long.

Abundant in meadows in the neighborhood of Victoria, Vancouver Island. Collected May 7, 1875, and examined by Austin, who concluded it was a large variety of *P. pyriforme*. Lesqueux and James make no mention of it. Remarkably fine specimens were again collected May 8, 1887, by John Macoun.

BRYUM ANGUSTIRETE, Kindb.

Differs from *B. pendulum* in the leaves narrow, ovate-lanceo-

late, reflexed all around; upper areolation very narrow, sublinear, basal cells reddish; costa red. Capsule sub-cylindric; pedicel arcuate above; teeth paler; spores small, scarcely 0.02 mm. Syncæcious.

On damp earth at the railway bridge over the Kananaskis, Rocky Mountains. Collected June 20, 1885, by John Macoun.

BRYUM VANCOUVERIENSE, Kindberg. n. sp.

Differs from *B. cæspiticiu*m in the leaves being longer acuminate, at base bright red, and reflexed only below the middle; cells small, upper very narrow, costa very thick, excurrent in most of the leaves; capsule not pendent and not constricted below the mouth; lid deplanate; spores larger, about 0.015 mm.; stem indistinct with gemmiform innovations; pedicel very long, 4-5 cm.

On wet slopes of Mount Finlayson at Goldstream, Vancouver Island. Collected June 28, 1887, by John Macoun.

BRYUM HYDROPHYLLUM, Kindberg. n. sp.

Closely allied to *B. pseudo-triquetrum*, but the leaves are narrower, ovate-lanceolate, reflexed at base or not at all; costa yellow; tufts loose, radiculose only below. Flowers and capsules not found.

Wet, springy places near the sea at Nanaimo, Vancouver Island. Collected June 4, 1887, by John Macoun.

BRYUM MEESIOIDES, Kindberg. n. sp.

Diæcious, densely cæspitose. Stem 1-2 c. m. high, reddish. Leaves yellowish, brown-margined, not decurrent, ovate oblong or short lanceolate, short acuminate, faintly denticulate at apex, slightly reflexed on the borders at the base, cells rhomboidal-oblong; costa red, scarcely excurrent, abbreviated in the lower leaves; male flowers discoid; perigonal leaves ovate-lanceolate, narrower areolate, denticulate from the middle; perichetial leaves narrow, more acuminate. Capsule narrowly pyriform, defluent to a longer collum, immature arcuate, pale, wide-mouthed, constricted below the mouth; lid convex, pale-yellow, mamillate, teeth pale yellow, connivent; annulus double; cilia perfect, long and appendiculate; basilar membrane very low or indistinct; pedicel 2-3 cm. long; spores very small, about 0.01 mm.

Differs from *B. turbinatum* in the leaves being narrower, brown margined and not decurrent; cells smaller; perigonal leaves denticulate; capsule arcuate and long-necked; spores smaller. Abundant in wet places at Nanaimo, Vancouver Island. Collected April 26, 1887, by John Macoun.

BRYUM (RHODOBRYUM) ONTARIENSE, Kindberg. n. sp.

Intermediate between *Bryum roseum* and *Bryum Beyrichii* (Hsch.) C. Muller. Comal leaves very numerous, lingulate, abruptly and short acuminate, revolute to $\frac{2}{3}$ or $\frac{3}{4}$, yellow-margined above with great confluent teeth; costa stout, excurrent. Capsule pale, with a distinct, curved collum half as long; teeth papillose and hyaline above; archegonia numerous; lid convex, short apiculate, not oblique.

Hitherto confounded with *Bryum roseum* and quite common throughout Ontario; generally in a barren state. On old logs in all maple woods around Ontario.

POLYTRICHUM (POGONATUM) MACOUNII, Kindberg.

Diœcious; laxly cæspitose, green, brownish when old. Stem rooting only at base, ascending 8-15 cm. high, dichotomous branching. Leaves very long (1.5-2 cm.), when dry spreading or patulose flexuose and convolute, humid subplane linear-lanceolate, cuspidate from the short sheathing, dirty whitish base, densely and sharply serrate, spinulose and reddish at back towards the apex; lamellæ numerous (about 60), entire, each of round sexangular cells, costa long excurrent; lower cells of the leaf bare, elongate and narrow, the upper oblong, the cell walls often oblique and irregular. Perichetial leaves shorter and more acute than the other; seta robust, 3-6 cm. long pale, finally orange. Vaginule glabrate, pale; capsule 6 mm. long, obliquely inclined, cylindric-oblong without neck at the base, narrowed below the mouth, constricted, not angulose, finally dark brown, at first greenish with the mouth orange, 6-7 mm. long and 2 mm. broad; lid large conic-subulate, at base orange 2 cm. long; teeth of peristome 32 short.

This robust and very distinct species is allied to the Japonian *Polytrichum grandifolium* Lindb. Abundant on the borders of ravines on the upper slopes (4,500 feet) of Mount Arrowsmith, Vancouver Island. Collected July 13, 1887, by John Macoun. *Polytrichum sexangulare*, Floerke.

Plants loosely cæspitose, not radiculose. Stems simple, erect, 1-2 cm. long. Leaves linear-lanceolate sub-obtuse, dry hooked-incurved; borders inflexed, entire or with 2-3 teeth at the apex; basal cells quadrate or short-rectangular. Capsule cubic-oval, 4-6-angular, inclined or erect; lid short-rostrate from a conic base, oblique; peristome subregular, hyaline; spores about 0.02mm.

Although Dr. Braithwaite (Brit. Mosses i., 51) describes the peristomial teeth as marked with an orange median line and the

leaves quite entire, I have no doubt in identifying this plant with the European species. Schimper (in Synop. Musc. Europ.) describes the spores of all *Polytricha* as very small. "Sporæ minimæ, vix 1-100 mm. metientes," but the European form has not smaller spores than the form above described. Not before found in North America.

On the summit of Copper Mountain, Bow River Pass, Rocky Mountains, alt. 7,500 feet, Aug. 10, 1885. Collected by John Macoun.

DICHELYMA LONGINERVE, Kindb. n. sp.

Habit of *Hypnum fluitans*. Stems erect, about 1 decim. high, loosely cæspitose, rootless, subpinnately branching. Leaves falcate, entire, the upper yellowish-green, oval-lanceolate, entire, long acuminate, by the $\frac{1}{4}$ - $\frac{1}{2}$ excurrent costa; most of the cells sublinear, the basal numerous, in 4-6 rows, subquadrate or rectangular, the alar greater, pellucid. Flowers and capsules unknown.

This species very much resembles a *Harpidium* and indeed may be one, as I thought at first sight. Quite common in dried-up ponds on sticks at Cedar Hill, near Victoria, Vancouver Island. Collected by John Macoun, June, 1887.

LESKEA NIGRESCENS, Kindberg.

Plants very small, densely tufted, blackish green, stems short, creeping, pinnate. Stem leaves close, appressed when dry, open-erect when moist, at base broadly ovate and scarcely reflexed, acuminate, entire, obscurely but faintly papillose, branchlet leaves erect, very much smaller and looser, blunt at the short acumen; cells round-oval, costa obsolete, rarely reaching to the middle. Diœcious. Fruiting specimens not found.

This species could possibly be referred to the genus *Heterocladium*, but the costa is not furcate. On flat boulders in McKay's Woods, Ottawa, Ont. Macoun, Oct. 12, 1885.

HYPNUN (CAMPTOTHECIUM) HAMATIDENS. Kindb.; (*Camp-tothecium Nuttallii*, Lesq. and James, l. c. in part.)

Diœcious. Densely cæspitose, yellow or green, glossy. Stems prostrate, scarcely or not radiculose, irregularly pinnate-ramose; branchlets short, attenuate and flexuose. Leaves open-erect, lanceolate, long filiform-acuminate, striate, hooked-denticulate or spinulose all around, reflexed on the borders; cells narrow, the basilar small and short; costa stout, vanishing at the

apex. Perichetial leaves nerveless, narrowed into an erect or flexuous subulate point, entire or slightly denticulate. Capsule cylindric-oblong, curved suberect or inclined, without a neck; segments split their whole length or coherent at apex; cilia rudimentary; annulus narrow; lid conic obtuse, depressed in the middle and mamillate; pedicel 1-1.5 cm. long, rough the whole length.

Related to *H. Nuttallii*, Wils, but differs as above. On logs and trunks at Nanaimo, Vancouver Island. June 8, 1887. Collected by John Macoun.

A Descriptive List of Staten Island Diatoms.*

By E. A. SCHULTZE.

Plate XC.

NAVICULA CARASSIUS, Ehr.

Navicula Carassius, Kütz. Bacill. p. 95, t. XXVIII. fig. 67; Rabenh. Süßw. Diat. p. 40, t. VI. 57; Ralfs in Prit. Inf. p. 900; Donkin Brit. Diats. p. 20, pl. III. fig. 7; O'Meara Rep. on Irish Diat. p. 412, pl. 34, fig. 20; Schum. Diat. der Hohen Tatra, p. 68.

Valve small, broadly lanceolate with produced capitate extremities; striæ moniliform, reaching to the median line, convergent opposite the central nodule and radiate towards the ends.

Hab.—Fresh water. Clifton. (Plate XC. fig. 13.)

A much smaller species than *N. pusilla* with much finer striæ, and at once distinguished by its narrow produced apices.—*Donkin*.

It is more than doubtful if the form described by Donkin as *Navicula Carassius* belongs to this species. The figure represents the form as very much longer, the ends finer and more produced, than is the case in *Navicula Carassius*; the striæ too, are described as granular, the striæ in *Navicula Carassius* are linear. Donkin regards the species as identical with *Navicula lacustris*, Gregory, A. J. M. S. 1856, p. 6, Pl. I. fig. 236, but the true *Navicula Carassius* is broadly elliptical, and not linear as the former is represented to be.—*O'Meara*.

There is a noteworthy difference of opinion between O'Meara and Donkin, as to the outline and striæ of *Navicula Carassius*. The Staten Island form closely resembles the figure drawn by West in Donkin; the form represented by O'Meara is almost too small for comparison.

*Continued from Vol. XIV., p. 114.